UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,731	04/18/2001	Miles Gordon Bader	NEC OSP-10546	9086

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HAYES, SOLOWAY P.C.
130 W. CUSHING STREET
TUCSON, AZ 85701

EXAMINER
KANG, INSUN

ART UNIT	PAPER NUMBER
2193	

DATE MAILED: 04/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
	09/837,731	BADER, MILES GORDON
Office Action Summary	Examiner	Art Unit
	Insun Kang	2193

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _18 October 2004_.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
    closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _18 October 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

    1.☐ Certified copies of the priority documents have been received.

    2.☐ Certified copies of the priority documents have been received in Application No. _____.

    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
        application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _10/18/2004_.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This action is in response to the amendment filed 10/18/2004.

2.   As per applicant's request, claim 2 has been cancelled and claim 1 has been

amended. Claim 1 is pending in the application.

Drawings

3.   The objection to the drawings has been withdrawn due to the amendment to the

drawings.

Specification

4.   The objection to the abstract has been withdrawn due to the amendment to the

Specification.

Claim Objections

5.   The objection to claims 1-2 has been withdrawn due to the amendment to the

claims.

Claim Rejections - 35 USC § 112

6.   The rejection to claims 1 and 2 has been withdrawn due to the amendment to the

claims.

Claim Rejections - 35 USC § 102

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.   Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Chow et al.(US Patent 5,768,596) hereinafter referred to as "Chow."

Per claim 1:

Chow discloses:

-avoiding excessive overhead by a programmed computer while using a form of SSA(Static Single Assignment) extended to use storage locations other than local variables(i.e. "method for a compiler to reduce the overhead in SSA representation in the presence of aliases... representing indirect memory operations together with ordinary scalar variables in SSA form," col 3 lines 26-40)

- using an SSA form compiler representation on a non-local memory location addressable by a function (i.e. "representing indirect memory operations, together with ordinary scalar variables in SSA form... building a uniform SSA representation of all the scalar and indirect memory operations of the program based on global value numbering," col 3 lines 38-56; see also col 1 lines 1-11, 22-24 and 56-67)

-inserting phi functions at any place in the function where multiple definitions of a same non-SSA variable may be merged, the phi-functions producing a new definition of the variable at a point where they are inserted (i.e. "When several definitions of a variable $a_1, a_2,...a_m$, reach a merging node in the control flow graph of the program, a ϕ function

assignment statement, an = $\phi(a_1,... a_m)$ is inserted to merge them into the definition of a

new variable version a_n," col 1 lines 40-50)

-determining the operations of said function that have the potential to implicitly read or

write complex variables that are in SSA form and for said operations, generating a list of

said complex variables and said potential reads or writes (i.e. "Hash expression trees

bottom up into the hash table, searching for any existing matching entry before creating

each new value number and entry," col 15 lines 55-67 and col 16 lines 1-14)

-adding, based on said generated list, write-back copy operations at appropriate

locations to write said complex variables that are in SSA form, the write-back copy

operations writing an SSA variable back to its real location (i.e. "traversal up the use-def

chain of the virtual variable starting from the current version to look for occurrences of

the same ivar node that are unaffected by stores associated with the same virtual

variable... processing the program in a pre-order traversal of the dominator tree of the

control flow graph guarantees that the earlier definitions are always processed... Also

make the var or ivar node point back to its defining statement," col 16 lines 1-8)

-adding, baded on said generated list, read-back copy operations at appropriate

locations to read values that were potentially modified back into new SSA definitions,

the read-back copy operations defining a new SSA variable from a variable's real

location (i.e. col 12 lines 45-67;col 16 lines 53-65)

-replacing every non-SSA variable definition by a definition of a unique SSA-variable,

and replacing every non-SSA variable reference by a reference to an appropriate SSA-

variable (i.e. "The algorithm is then applied to compute SSA form for all the scalar and

indirect variables ... the resulting SSA representation must have each occurrence of an

indirect variable annotated with ... virtual variable," col 12 lines 45-67; ")

as claimed.

9.   Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by

Radigan (US Patent 5,999,735).

Per claim 1:

Radigan discloses:

-avoiding excessive overhead by a programmed computer while using a form of

SSA(Static Single Assignment) extended to use storage locations other than local

variables("Proper placement of phi-nodes may reduce the compiler execution time and

... reduce the execution time of the computer programs... inefficient to place phi-nodes at

every join point in the SSA intermediate language. A more optimal method may be

placing a phi-node immediately preceding all statement nodes that contain a use that

has multiple reaching definitions," col 8 lines 61-67; a method of creating a rank-n static

single assignment intermediate language from a rank-(n-1) static single assignment

intermediate language," col 5 lines 15-25)

- using an SSA form compiler representation on a non-local memory location

addressable by a function ("a method of creating a rank-n static single assignment

intermediate language from a rank-(n-1) static single assignment intermediate

language," col 5 lines 15-25)

-inserting phi functions at any place in the function where multiple definitions of a same

non-SSA variable may be merged, the phi-functions producing a new definition of the

variable at a point where they are inserted ("placing a phi-node immediately preceding

all statement nodes that contain a use that has multiple reaching definitions," col 8 lines

61-67;

-determining the operations of said function that have the potential to implicitly read or

write complex variables that are in SSA form and for said operations, generating a list of

said complex variables and said potential reads or writes ("If a statement node that

contains a rank-0 definition that reaches a statement node containing a rank-0 use is

found during the depth-first search, then the rank-0 definition and the rank-0 use are

renamed with a temp," col 9 lines 12-58)

-adding, based on said generated list, write-back copy operations at appropriate

locations to write said complex variables that are in SSA form, the write-back copy

operations writing an SSA variable back to its real location (see Fig 3 Rank-1 SSA

Intermediate Language and Rank-2 SSA intermediate language control flow diagram)

-adding, baded on said generated list, read-back copy operations at appropriate

locations to read values that were potentially modified back into new SSA definitions,

the read-back copy operations defining a new SSA variable from a variable's real

location (see Fig 3 Rank-1 SSA Intermediate Language and Rank-2 SSA intermediate

language control flow diagram)

-replacing every non-SSA variable definition by a definition of a unique SSA-variable,

and replacing every non-SSA variable reference by a reference to an appropriate SSA-

variable ("when a rank-n... SSA intermediate language is created, B[t₅] will be renamed

to t₆ in the rank-1 definition and the rank-1 use," col 10 lines 63-67)

as claimed.

Response to Arguments

10.   Applicant's arguments filed 11/3/2004 have been fully considered but they are

not persuasive.

Per claim1:

The Applicant states that:

While Chow et al. and Radigan both teach the use of SSA representation with the insertion of phi

functions, neither Chow et al. nor Radigan discloses any of the foregoing steps.

In response, the Applicant fails to discuss the references applied against the

claims, specifically explaining how the claims avoid the references or distinguish from

them and to point out disagreements with the examiner's contentions. Applicant's

arguments fail to comply with 37 CFR 1.111(b) because they amount to a general

allegation that the claims define a patentable invention without specifically pointing out

how the language of the claims patentably distinguishes them from the references.

Further, as recited above, Chow and Radigan discloses determining the

operations of said function... adding, based on said generated list, write-back copy

operations... read-back copy operations... from a variable's real location (Chow, i.e. 5

lines 55-67 and col 16 lines 1-14; col 12 lines 45-67;col 16 lines 53-65; Radigan, i.e. col

9 lines 12-58; see Fig 3 Rank-1 SSA Intermediate Language and Rank-2 SSA

intermediate language control flow diagram). Therefore, the rejection of claim 1 is

considered proper and maintained.

Conclusion

11.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

12.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Insun Kang whose telephone number is 571-272-3724.

The examiner can normally be reached on M-F 7:30-4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Kakali Chaki can be reached on 571-272-3719. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

I. Kang
Examiner
4/13/2005

KAKALI CHAKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100